

# **KAGI Heating Supplies & Manufacturing, Inc.**

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Dear Patent Examiner:

There are many different waste oil fired burners on the market; however, they do not have the unique features my burner has. For instance:

1. When one runs out of waste oil, with a simple flick of a switch, one can safely burn kerosene and #1 and #2 furnace fuels. Many burners on the market, the oil preheaters cannot be turned off which can result in a dangerous situation. Waste oil must be heated to at least 160 degrees F. to ignite. Heating #2 furnace fuels reduces the viscosity to fewer than 2.5 centistokes. Gasoline is 2.2 centistokes.
2. When one turns a switch off on a electrical circuitry, how do you get a warning lamp to come on when the current is also turned off? I have this feature on the Kagi burner.
3. The oil-heating element in my burner lays cold and dormant, and when the burner calls for heat, it becomes electrically energized and starts to heat less than two ounces of oil in the preheater oil cavity. The other burners on the market utilize only one heating element and keep the preheater block extremely hot, resulting in excess heat shortening the life of oil diaphragms on the block and oxidizing the oil in the preheater block resulting in particles plugging the discharge nozzle.
4. There is an oil temperature sensor in the KAGI burner that turns a green indicating lamp on when the waste oil is at optimum ignition temperature. I do not see this feature on other waste oil burners sold.
5. All waste oil burners drip oil from the nozzle due to colloidal particles in waste oil. It is hard to find a seal or valve that will completely make a good seal. Each manufacturer uses different methods to stop this oil dripping. I have an air tank between the discharge nozzle and the N.C. air valve, which blows out and burns any residual oil from the nozzle assembly. It also discharges compressed air gradually from the nozzle, enriching the fuel to air mixture for a more reliable ignition. The theory is similar to an acetylene torch. When the gas pressures are set too high,



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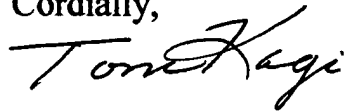


one cannot ignite the mixture as the gas is exiting the nozzle at too high a velocity for ignition. By slowing the gas or installing a larger nozzle, ignition occurs.

- 6 I have a special flame cone designed to burn waste oil. Most of the burners on the market are converted #2 fuel oil burners and the flame cone they use will carbon-up and short out the electrodes anywhere from 2 weeks to two months. The outer sleeve on my flame cone directs the oil impingement into the flame oxidation zone, raising the thermal efficiency of the burner and furnace.
- 7 The Kagi burner uniquely has the oil-heating element directly into the oil, making heat transfer from the heating rod to the oil more rapid and efficient. The Kagi burner is the only burner on the market that heats the waste oil in this fashion. All the others heat the aluminum preheater block, which in turns heats the oil in the passages. They move the oil back and forth through the oil passages in the aluminum block, picking up heat and the slowing of the oil flow increases oil oxidation in the oil passages leading to clogged oil passages and coating of the oil passages with sludge.

Please review the above information on my burner. I would appreciate a broad patent covering all the innovations on my burner instead of individual patents.

Cordially,

A handwritten signature in black ink that reads "Tom Kagi". The signature is written in a cursive, flowing style.

Thomas Kagi/Engineer